

CLAIMS

What is claimed is:

- 1 1. A method for managing a memory system having a plurality of subsystems,
2 comprising the steps of:
3 upon accessing the subsystems for a piece of data used by a first process,
4 determining the access time to acquire the piece of data in the
5 memory system;
6 comparing the determined access time to a threshold; and
7 taking an action based on the results of the comparing step;
8 wherein accessing the subsystems is in a non-sequential order.
- 1 2. The method of claim 1 wherein data blocks containing the piece of data is placed
2 in the memory system based on information selected in one or a combination of:
3 a movement pattern of data in a data block,
4 a structure of the memory system, and
5 a cache-level architecture in the memory system.
- 1 3. The method of claim 1 further comprising the steps of:
2 using a memory table having entries pointing to data blocks storing data
3 for at least one subsystem; and
4 using the entries to locate the access data.
- 1 4. The method of claim 3 wherein the memory table working with a memory
2 manager managing the data blocks independent of an operating system working
3 with the memory system and independent of a processor working with the memory
4 system.

1 5. The method of claim 1 further comprising the steps of:
2 using a memory table having entries pointing to data blocks storing data
3 for the memory system; and
4 the memory table using a physical address of a memory page
5 corresponding to the piece of access data to convert to a location
6 address corresponding to an entry pointing to the location of the
7 piece of access data.

1 6. A method for managing a memory system, comprising the steps of:
2 upon accessing the memory system for a piece of data used by a first
3 process,
4 a processor working with the memory system continuing its
5 functions until it is stalled;
6 comparing the time taken to complete the memory access to a
7 threshold; and
8 if the time taken to complete the memory access is close to, equal
9 to, or greater than the threshold, then taking an action.

1 7. The method of claim 6 wherein the action is selected in one or a combination of
2 postponing executing the first process and allowing executing a second
3 process;
4 causing the first process to be switched to a second process; and
5 causing a performance monitor on the memory system or on a system using
6 the memory subsystem.

1 8. The method of claim 6 further comprising the step of polling a latency manager for
2 the time taken to complete the memory access; the latency manger being part of
3 managing the memory system.

- 1 9. The method of claim 6 further comprising the steps of:
 - 2 using a memory table having entries pointing to data blocks storing data
 - 3 for at least one subsystem; and
 - 4 using the entries to locate the access data.
- 1 10. The method of claim 9 wherein the memory table working with a memory manager managing the data blocks independent of a processor working with the memory system and independent of an operating system working with the memory system.
- 1 11. A method for managing a memory system, comprising the steps of:
 - 2 upon accessing the memory system for a piece of data used by a first process
 - 3 counting a time elapsed from the time the data access starts; the counted time being increased as the data is being accessed;
 - 4 comparing the counted time to a threshold; and
 - 5 if the counted time is close to, equal to, or greater than the threshold, then taking an action selected in one or a combination of
 - 6 postponing executing the first process and allowing
 - 7 executing a second process;
 - 8 causing the first process to be switched to a second process;
 - 9 and
 - 10 causing a performance monitor on the memory system or on
 - 11 a system using the memory system.
- 1 12. The method of claim 11 further comprising the steps of:
 - 2 using a memory table having entries pointing to data blocks storing data
 - 3 for at least one memory subsystem; and

4 using the entries to locate the access data.

- 1 13. A computer-readable medium embodying instructions for a computer to perform a
2 method for managing a memory system having a plurality of subsystems, the
3 method comprising the steps of:
4 upon accessing the subsystems for a piece of data used by a first process,
5 determining the access time to acquire the piece of data in the
6 memory system;
7 comparing the determined access time to a threshold; and
8 taking an action based on the results of the comparing step;
9 wherein accessing the subsystems is in a non-sequential order.
- 1 14. The computer-readable medium of claim 13 wherein data blocks containing the
2 piece of data is placed in the memory system based on information selected in one
3 or a combination of:
4 a movement pattern of data in a data block,
5 a struct~~ur~~ of the memory system, and
6 a cache-level architecture in the memory system.
- 1 15. The computer-readable medium of claim 13 wherein the method further
2 comprising the steps of:
3 using a memory table having entries pointing to data blocks storing data
4 for at least one subsystem; and
5 using the entries to locate the access data.
- 1 16. The computer-readable medium of claim 15 wherein the memory table working
2 with a memory manager managing the data blocks independent of an operating

3 system working with the memory system and independent of a processor working
4 with the memory system.

1 17. The computer-readable medium of claim 13 wherein the method further comprises
2 the steps of:

3 using a memory table having entries pointing to data blocks storing data
4 for the memory system; and
5 the memory table using a physical address of a memory page
6 corresponding to the piece of access data to convert to a location
7 address corresponding to an entry pointing to the location of the
8 piece of access data.

1 18. A computer-readable medium embodying instructions for a computer to perform a
2 method for managing a memory system, the method comprising the steps of:

3 upon accessing the memory system for a piece of data used by a first
4 process,
5 a processor working with the memory system continuing its
6 functions until it is stalled;
7 comparing the time taken to complete the memory access to a
8 threshold; and
9 if the time taken to complete the memory access is close to, equal
10 to, or greater than the threshold, then taking an action.

1 19. The computer-readable medium of claim 18 wherein the method further comprises
2 the step of polling a latency manager for the time taken to complete the memory
3 access; the latency manger being part of managing the memory system.

1 20. The computer-readable medium of claim 18 wherein the method further comprises
2 the steps of:

3 using a memory table having entries pointing to data blocks storing data
4 for at least one subsystem; and
5 using the entries to locate the access data.

1 21. A computer-readable medium embodying instructions for a computer to perform a
2 method for managing a memory system, the method comprising the steps of:

3 upon accessing the memory system for a piece of data used by a first
4 process,
5 counting a time elapsed from the time the data access starts; the
6 counted time being increased as the data is being accessed;
7 comparing the counted time to a threshold, and
8 if the counted time is close to, equal to, or greater than the
9 threshold, then taking an action selected in one or a combination of
10 postponing executing the first process and allowing
11 executing a second process;
12 causing the first process to be switched to a second process;
13 and
14 causing a performance monitor on the memory system or on
15 a system using the memory subsystem.

1 22. The computer-readable medium of claim 21 wherein the method further comprises
2 the steps of:

3 using a memory table having entries pointing to data blocks storing data
4 for at least one memory subsystem; and
5 using the entries to locate the access data.

- 1 23. An apparatus for managing a memory system having a plurality of subsystems,
2 comprising:
 - 3 means for, upon accessing the subsystems for a piece of data used by a first
4 process,
 - 5 determining the access time to acquire the piece of data in the
6 memory system;
 - 7 comparing the determined access time to a threshold; and
 - 8 taking an action based on the results of the comparing step;
9 wherein accessing the subsystems is in a non-sequential order.
- 1 24. The apparatus of claim 23 wherein data blocks containing the piece of data is
2 placed in the memory system based on information selected in one or a
3 combination of:
 - 4 a movement pattern of data in a data block,
 - 5 a structure of the memory system, and
 - 6 a cache-level architecture in the memory system.
- 1 25. The apparatus of claim 23 further comprising a memory table having entries
2 pointing to data blocks storing data for at least one subsystem; the entries being
3 used to locate the access data.
- 1 26. The apparatus of claim 25 wherein the memory table working with a memory
2 manager managing the data blocks independent of an operating system working
3 with the memory system and independent of a processor working with the memory
4 system.
- 1 27. The apparatus of claim 23 further comprising a memory table having entries
2 pointing to data blocks storing data for the memory system; the memory table

3 using a physical address of a memory page corresponding to the piece of access
4 data to convert to a location address corresponding to an entry pointing to the
5 location of the piece of access data.

1 28. An apparatus for managing a memory system, comprising:
2 upon accessing the memory system for a piece of data used by a first
3 process,
4 a processor for working with the memory system and for continuing
5 its functions until it is stalled;
6 means for comparing the time taken to complete the memory access
7 to a threshold; and
8 means for taking an action if the time taken to complete the
9 memory access is close to, equal to, or greater than the
10 threshold.

1 29. The apparatus of claim 28 further comprising means for polling a latency manager
2 for the time taken to complete the memory access; the latency manger being part
3 of managing the memory system.

1 30. The apparatus of claim 28 further comprising a memory table having entries
2 pointing to data blocks storing data for at least one subsystem; the entries being
3 used to locate the access data.

1 31. An apparatus for managing a memory system, comprising:
2 upon accessing the memory system for a piece of data used by a first
3 process,

4 means for counting a time elapsed from the time the data access
5 starts; the counted time being increased as the data is being
6 accessed;
7 means for comparing the counted time to a threshold, and
8 if the counted time is close to, equal to, or greater than the
9 threshold, means for taking an action selected in one or a
10 combination of
11 postponing executing the first process and allowing
12 executing a second process;
13 causing the first process to be switched to a second process;
14 and
15 causing a performance monitor on the memory system or on
16 a system using the memory subsystem.

- 1 32. The apparatus of claim 31 further comprising a memory table having entries
2 pointing to data blocks storing data for at least one memory subsystem; the entries
3 being used to locate the access data.

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